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Abichandani, Deepa; Hule, Vinayak

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Common Musculoskeletal Injuries Faced by B-Boydancers

Dr. Deepa Abichandani[1], Vinayak Hule[2]

[1]Assistant Professor, School of Physiotherapy, D. Y. Patil University, Navi Mumbai, India

[2]Final Year Student, School of Physiotherapy, D. Y. Patil University, Navi Mumbai, India

Abstract: ***Dancers have high risk for injury like any athlete. Objective: To study musculoskeletal injuries faced by B-Boy dancers and their understanding about protective gears, dance floor and footwear and physiotherapy. Method: A survey based study using self-devised pre validated questionnaire. Result:24.04% breakers reported injury at knee;17.31% in lowerback;16.35%in shoulder; 15.38% arms/hands; 9.62% at wrist;8.65% in neck and ankle while lowest were elbow, thigh, ribs and feet. Conclusion: Common injuries: Knee > Lower Back > Shoulder > Arms / Hand. Dancers need to be made aware regarding Physiotherapy's role in injury prevention and post-injury rehabilitation.***

Keywords: B-Boy, breakers, injury, prevention, physiotherapy

1. Introduction

B-boying is a form of dance which places extreme unique physical demands in terms of flexibility, strength, endurance. B-boying also known as "break dance" or "breaking" combines dance, music, lifestyle and acrobatic sport. It is regarded as a popular adolescent sport in Asia, Europe and America, although its popularity peaked in the 1980"s.[1,2]As with any athlete, the dancer has a high risk for injury. In the literature, the definition of injury has not been consistent. In soccer reports, it has been defined as all that provokes the loss of at least one training session or game, and in dance, the loss of at least one performance, training session, or a rehearsal, when the damage caused required medical attention with severity of injury being determined by the loss of time in physical activity. The incidence rate has been reported to range from 1.86 to 6.7 injuries/dancer/year in dance companies and 0.13 to 0.87 injuries/1000hrs of training. Inadequate studio floors, the rotation demand in en dehors, the design of dance footwear (as well as dancing without footwear), and bad technique have been described as risk factors for the injury. Thus, there are several factors that can provoke chronic injuries in dancers, such as the presence of physical constraint, inadequate rest after injury, and lack of early detection and treatment.[3]

There are four essential elements that make up B-boying which are: Toprock (refers to foot movement performed from a standing position, introducing yourself on the floor), Footwork (known as floor work, describes movement where the B-boy goes down on the floor and is supported by only his or her hands and feet), Power (are the dynamic moves and require a lot of practice), and Freezes (B-boy poses and stops in a stylish position).B-boys come up with sets/routines that consist of these four elements, whether they are battling, performing for a crowd, or just practicing.[4]B-boying dancers are clearly athletes with respect to the degree to which they require physical capacities to perform at a higher level with speed, agility, coordination, motor control and psychological readiness utilizing muscular strength and endurance, anaerobic and aerobic energy systems which are essentials for dance performance.[5]To the author"s best knowledge, there has been no study done on musculoskeletal injuries faced by Indian B-boy dancers for which this study was undertaken.

2. Aim and Objective

To Find the Common Musculoskeletal Injuries Faced By B-Boying Dancers. To understand their knowledge regarding protected gears, dance floor, dance footwear, physiotherapy as a treatment approach.

3. Review of Literature

1) Max Daniel Kauther, MD, Christian Wedemeyer et al did a study „Breakdance Injuries and Overuse Syndromes in Amateurs and Professionals". It was a descriptive epidemiology study in which 40 breakdance professionals and 104 amateurs were surveyed by questionnaire. There were 1665 injuries and 206 overuse syndromes found in 380, 588 hours of training, leading to a loss of 10,970.6 training days. Professionals reported significantly more injuries and overuse syndromes of the wrist, knee, hip/thigh, ankle/foot, and elbow. They concluded that Breakdancing must be considered as a potentially high-risk dancing sport.

2) Ashley Gaines did a study „Common Foot and Ankle Injuries in a Dancer". It was a computer search using PubMed and Sport Discus generated articles relevant to ankle and foot injuries in this specific population. Peer-reviewed articles were used to reference the points made in this review. A total of fourteen papers were reviewed. The most common of the foot and ankle injuries was the lateral ankle sprain. Tendinopathies of the lower extremity musculature, especially the peronei and the flexor hallicuslongus, were the second most common injury. Other injuries included posterior ankle impingement syndrome and chronic ankle instability.

3) Jill Inouye, Andrew Nichols, Gregory Maskarinec et al did a study „A Survey of Musculoskeletal Injuries

Associated with Zumba"; was conducted with a convenience sample of 49 adults (age 18 and older) in 5 Zumba classes. Participants were randomly selected and asked to complete a short written survey on their age, gender, how long they had taken Zumba, number of classes per week, hours per class, if they had ever experienced any injuries from Zumba, and if yes, the body part that was injured, and if they sought medical attention for their injuries. Forty-nine participants completed the survey (100% response rate). Participants were on average 43.9 years old taking Zumba classes for an average of 11.8 months and 3 classes per week ranging from 1 to 2 hours in duration. They concluded that 1 in 4 Zumba participants reported previous Zumba-related injuries, with higher rates of injury among participants taking more classes per week (56% among those taking 4 or more classes per week).

4. Methodology

- **Research approach** : Cross-sectional survey
- **Study design** : Data collected via questionnaire direct method.
- **Study setting :** The Break King, Vasai/ King of kings, Kalina Mumbai & Navi Mumbai
- **Study Sample:**B-Boy dancers aged between17 to 30 yrs.
- **Ethical clearance:** The Ethical clearance for the studywas taken from the Institutional Ethics committee ofDr. D. Y. Patil University, Nerul, Navi Mumbai.
- **Procedure:** A self-devised pre validated questionnaire was administered to the study subjects via mail,as far as possible the questions were closed ended for easier grouping & to prevent any statistical errors.

5. Results

It was found that 47% of breakers had an experience of more than 12years in B-Boying ; 5 % had for 8-12yrs while 20% had for 4-8yrs.Also, only 87 % (91) breakers were found to take pauses in between their dance practices. 85 % (89) and 45% (47) breakers did warm up before practice and adequate cool down post sessionrespectively, while others were not regular or completely ignored it.

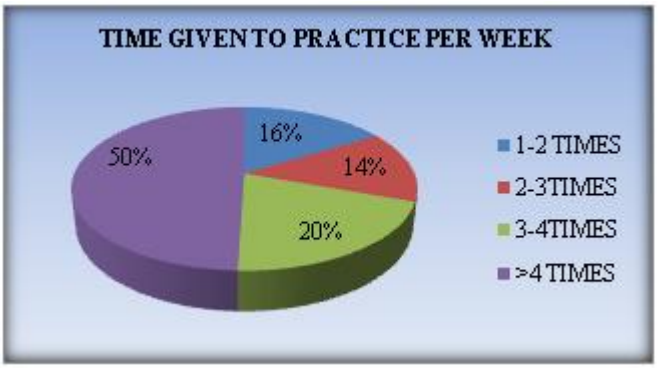

Figure 1:

According to Figure 1, 51% (52) of breakers practiced >4times a week; 20% (21) of breakers practiced 3-4times;16% (17) practiced 1-2times while 14% (15) practiced 2-3times.

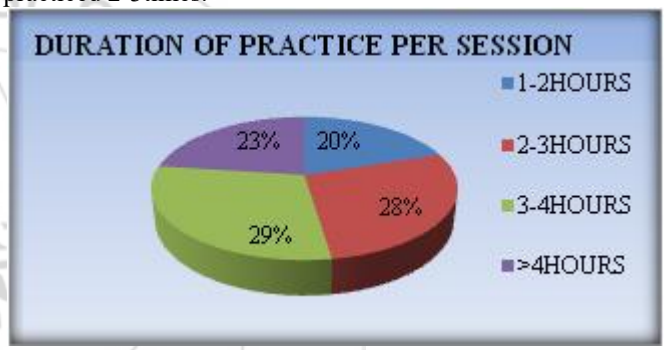

Figure 2

According to Figure 2, 30 % (31) breakers practiced 3-4hours per session; 28 % (29) practiced 2-3hours per session; 23 % (24) practiced >4 hours per session while 20 % (21) practiced 1-2hours per session.

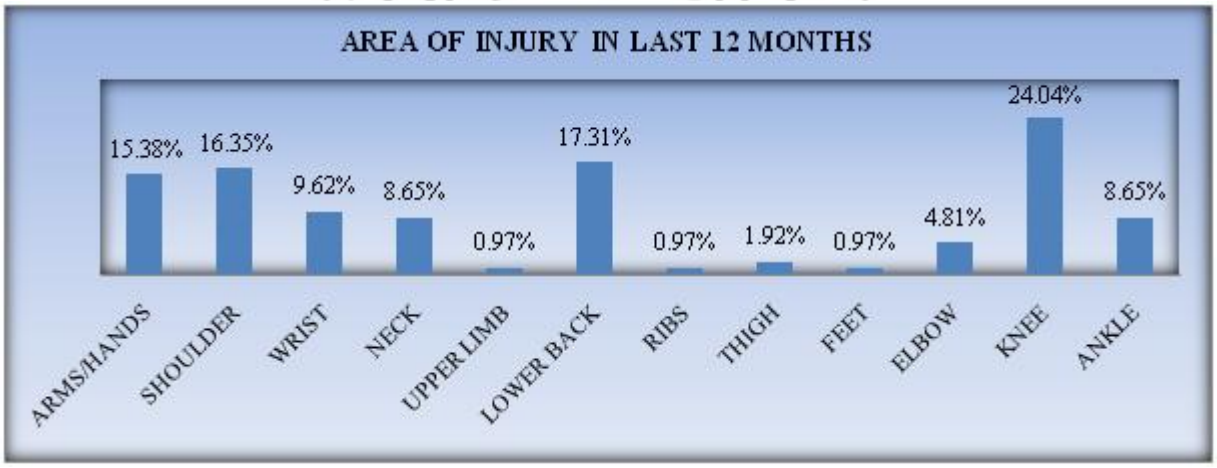

Figure 3

According to Figure 3,24.04% breakers reported of injury at the knee;17.31% in the lowerback;16.35% in the shoulder;15.38% in the arms/hands;9.62% in the wrist;8.65% in the neck;8.65% in the ankle;4.81% breakers in the elbow;1.92% in the thigh;0.97% breakers in the upper limb; 0.97% breakers in the ribs; 0.97% in the feet.

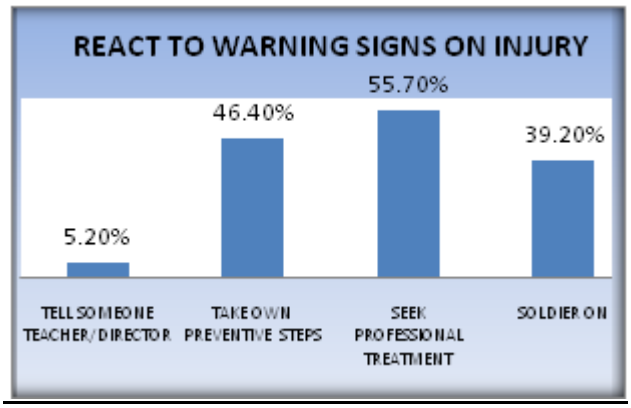

Figure 4

The above figure 4, shows the breakers reacting to warning signs on injury,55.70 % (54) took professional treatment; 46.40 % (45) took preventive steps; 39.20 % (38) soldiered on their injury while 5.20 % (5) breakers reacted by telling someone.

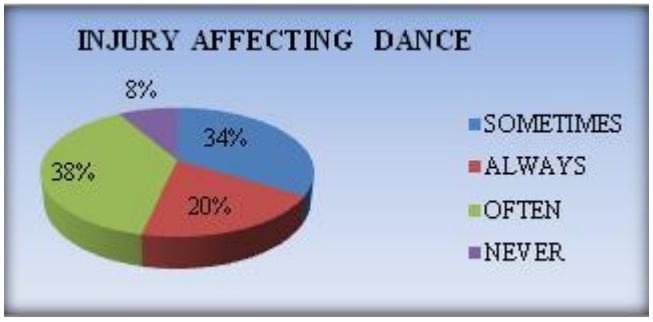

Figure 5

The above figure 5 shows that38% (27) breakers reported that injury affected their dance often; 34% (24) reported sometimes; 20% (14) reported always while only 8 % (6) reported no interruption in their dancing.

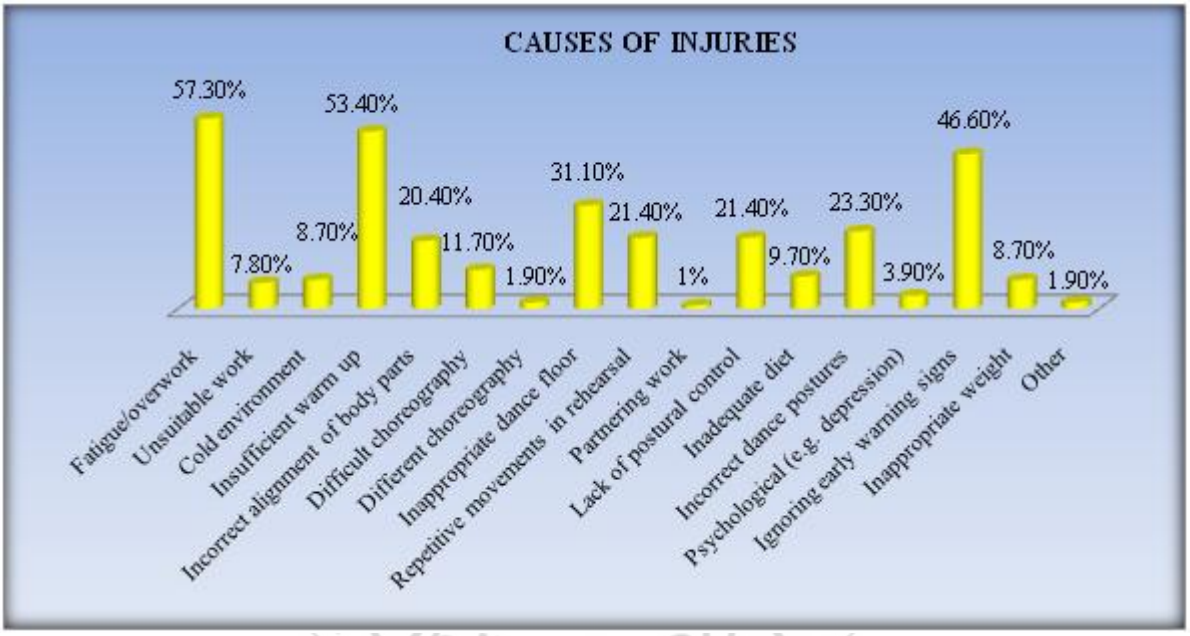

Figure 6

The above figureshows the various causes of injuries where 57.30% (59) breakers pointed out the cause of the injury as fatigue/overwork; 53.40% (55) reported insufficient warm up; 46.60% (48) as ignoring early warning signs; 31.10% (32) as inappropriate dance floor ; 23.30% (24) as incorrect dance postures; 21.40% (22) as lack of postural control; 21.40% (22) as repetitive movement; 20.40% (21) as incorrect alignment of body; 11.70% (12) as difficult choreography; 9.70% (10) as inadequate diet; 8.70% (9) as cold environment; 8.70% (9) as inappropriate weight; 7.80% (8) as unsuitable work; 3.90% (4) as psychological; 1.90% (2) as different choreography 1% (1) as partnering work; 1.90 (2)have other reasons.

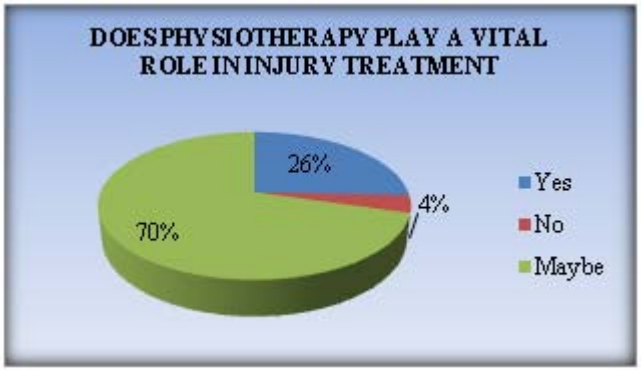

Figure7

The above figure shows about the awareness regarding physiotherapy playing a vital role in the injury treatment, where only 26% (27) breakers reported that it plays a vital role while 70% (74) breakers reported that physiotherapy may have a vital role in treatment and 4% (4) denied its role.

On surveying regarding various treatments taken by the dancers, it was found that31.40 % (11) took physiotherapy after injuries; 25.70% (9) took general practitioners treatment after injuries; 20% (7) took specialist/consultation while 14.30% (5), 11.40 %(4) and 8.60% (3) took other help, masseur session and counselling respectively.47% (22) breakers took less than a week to resume back to practice after injury; 34% (16) took 1-2weeks; 13% (6) took 3-4 weeks while 6% (3) took>1month to resume back to practice.

Regarding protective gears and dance shoes, it was seen that only 59 % (62) and 48% (61) breakers wore protective gears and dancing shoes.

6. Discussion

The purpose of this study was to find the various musculoskeletal injuries faced by B-Boy dancers, in Mumbai and Navi Mumbai.

Using the definition of the American Academy of Paediatrics, breakdance should be categorized as a "contact" or "collision" sport, as the dancers purposely collide or hit with the ground with great force or routinely make contact with each other or inanimate objects but usually with less force than in collision sports.[6]Due to the physical demand and nature of dance styles, a dancer, like any other athlete, is not immune to injury. The most common injuries sustained during dance, specifically modern, are to the lower leg, ankle, foot, lumbar spine, and knee.[7, 8] With a high injury incidence, it is important to consider the impact of several intrinsic and extrinsic factors on injury risk, including dance style, hours danced, flooring surface, and shoe type.[9]These factors are present in all dance environments contributing to multiple injuries.

Knee:
Knee soft tissue injuries, traumatic injuries are some of the most common and clinically challenging musculoskeletal injuries. They occur as when you run and jump, your legs absorb the ground reaction forcesagainst your body weightwhich travels through the knee, inturn gettingeasily injured through overuse.Knee injurieshave been found to be most common injuries among the b-boys attributed to their maximum collision or contact to the floor during foot work, freezes and dynamic power moves. Avoidance of protective gears during practice or performance phase has also been found to be a contributing factor in the previous studies (Fulton, Jessica et al. "Injuries Presenting To A Walk-In Clinic At A Summer Dance Intensive Program &Kauther et al. "Breakdance Injuries And Overuse Syndromes In Amateurs And Professionals").[11,12]

***Lower Back*:**
The human spine naturally has curvatures and our body placement with respect to these curvatures is referred to as neutral spine. Many activities often force one"s body to move against or extremely within these curves that can cause serious injury to the muscles and bones. A B-boying dancer places unique physicaldemands on the spine for various vigorous postures like freezes, dynamic power moves and other elements of the b-boying which are known to cause effects on the spine. Previous studies also have shown that lower back injury is also one of the most common injuries faced by dancers.

***Shoulder*:**
Dancers are particularly susceptible to these injuries due to all the overhead lifts and falling during practice and performance. A dancer usually practices a routine rigorously for months before a performance and often performs more than once a day for several hours thus explaining the high possibility of shoulder injuries. Also, B-boy balances his body weight on his shoulder for a freeze, experiencing more strain on his neck and shoulder muscles.

***Arms / Wrist / Hands*:**
Dancers are particularly susceptible to these injuries due to increased load and stress forceson the elbow joint as well as demands placed over the muscles of forearm, in order to combat the weight bearing forces on the hand, weight shifting, gliding and sliding. Also, maintenance of LOG within the minimum base of support which is the hand during various postures attained by the B-Boy is a contributing factor.

Causes of Injuries --

Fatigue/overwork:
Fatigue is the lack of energy and motivation (both physical and mental). Fatigue is a very common complaint reported by dancers and could be caused by insufficient energy to power high intensity workouts and increased levels of muscular discomfort. Persistent dance sessions even after fatigue (lactate) has set in the muscles have been proven to be a risk factor for causing musculoskeletal injury as bone,muscles,tendon,ligaments,each have theirown breaking point, beyond which they cease to function and aremore likely to develop overuse syndrome or repetitive stress injury.[13]

Insufficient warm up:
Insufficient warm-up prior to physical activity leads to injury among dancers. The role of warming up prior to exercise in relation to injury prevention is to reduce the chance of injury during dance and in turn help improvise the performance. This prepares the dancer physically and mentally providing long term benefits.

Ignoring early warning signs:
Ignoring early warning signs can creep up slowly and progressively get worse leading to chronic problems.[14]

Inappropriate dance floor:
Dance floors are an integral part of the dance environment[15]. If a surface is very hard, very soft, or has high variability in firmness throughout, it could increase the risk of injury to the dancer. Potential repetitive injuries that could occur include stress reaction through the bones of the feet, shins, or lumbar vertebrae, while acute injuries could primarily involve sprain to the ankle joint and other soft tissue injuries.[16]

Incorrect dance postures:
Aches and pains can be traced to "poor posture".Poor posture is the posture that results from certain muscles tightening up or shortening while others lengthen and become weak which often occurs due to various factors that can impact on posture and they include occupational activities and biomechanical factors such as force and repetition. Thus this can explain why incorrect dance postures contribute to occurrence of injuries.

Lack of postural control:
Lack of postural control could lead to fall and lead to injuries during various elements in breaking.

Inadequate diet:
For obtaining the energy needed for dance training and performance, a right balance of carbohydrate, fat, protein, micronutrients, and fluids should be followed for which the dancer should visit a dietician.

Physiotherapy –

Physiotherapy is defined as the care and services provided by or under the direction and supervision of a physical therapist (American Physical Therapy Association, 2003). Physiotherapy uses a variety of techniques to help your muscles and joints work to their full potential, helping to repair damage by speeding up the healing process and reducing pain and stiffness.[17]Hence, physiotherapy can help a dancer to be more creative using motor learning approaches, proper biomechanics and new movement patterns and help understand balance,movement control and stabilization, thus, aiming to optimise dancer‟s function and wellbeing, reducing disability and lifestyle restrictions.

7. Conclusion

The occurrence of musculoskeletal injuries was common among B-Boy dancers. Most common injuries were found as follows: Knee > Lower Back > Shoulder > Arms / Hand. Most of the dancers were aware about the importance of dance floor, dance shoes and protective gears but very few were found to follow it. Also, B-Boy dancers need to be made more aware regarding Physiotherapy and its role in injury prevention as well as in complete rehabilitation post-injury.

8. Clinical Implication

Physiotherapy camps and seminars could be implemented at various dance schools and institutes in order to help dancers understand the importance of physiotherapy in injury prevention and rehabilitation post – injury. Also, various applications of physiotherapy treatment strategies could help improvise dancer‟s performance on long term basis giving them physical as well as mental boost and motivation.

9. Acknowledgement

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Author Profile

Dr. Deepa Abichandani is an Assistant Professor at School of Physiotherapy, D.Y Patil University. She specializes in Musculoskeletal and rehabilitative aspects of Physiotherapy.

Vinayak Huleis currently doing his Internship from School of Physiotherapy, D.Y Patil University, Nerul. He has keen interest in Musculoskeletal and Sports Physiotherapy.